EPA Region 7 TMDL Review

TMDL ID	52	*Water Body ID*	lake
Water Body Name	Crystal Lake		
Pollutant	Eutrophication		
Tributary			
State	KS	*HUC*	10290101
Basin	Upper Marais des Cygnes		
Submittal Date	6/28/2001		
Approved	yes		

Submittal Letter

State submittal letter indicates final TMDL(s) for specific pollutant(s)/ water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.

Submittal letter dated June 28, 2001.

Water Quality Standards Attainment

The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.

This TMDL implements the Kansas narrative water quality standard for nutrients. The narrative standard for nutrients is interpreted as a numeric chlorophyll-a concentration endpoint. Assessment indicates that phosphorus and nitrogen are co-limiting pollutants causing the eutrophication. The estimated current loadings are 716.5 #/yr of phosphorus and 2596.4 #/yr of nitrogen. Target loading capacities that should attain and maintain applicable water quality standards were set at 233.7 #/yr for phosphorus and 1124.4 #/yr of nitrogen. This is a phased TMDL.

Numeric Target(s)

Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

The narrative standards and the designated beneficial uses are described. The numeric targets for water bodies in Kansas are described in "A Primer on Lake Eutrophication and Related Pollution Problems" (KDHE 1998) and "The Lake and Wetlands Program Monitoring Report" (KDHE 1999), which are incorporated by reference into all Kansas eutrophication TMDLs. For the Secondary Contact Recreation designated beneficial use, the numeric target for the chlorophyll-a concentration is 20 ug/l or less.

Link Between Numeric Target(s) and Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.

The link between the numeric target for chlorophyll-a concentration and phosphorus loading is provided in a Memorandum dated August 5, 1999 from Ed Carney (KDHE) to Tom Stiles (KDHE), with two attachments. This memo is included by reference into all Kansas eutrophication TMDLs. This memo describes a study of 173 water bodies that are not light-limited, and provides the regression relationships between total phosphorus and chlorophyll-a used to establish loadings. Modeling (BATHTUB/CNET) and regional coefficients were used to estimate existing lake phosphorus and nitrogen loads and reductions necessary to meet chlorophyll-a targets. A full description of the methodology used for Kansas lake TMDLs can be viewed on the KDHE TMDL website (http://www.kdhe.state.ks.us/tmdl/eutro.htm).

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.

Source inventory and assessment includes descriptions of land use and the potential for non-point source pollutants, and, discusses any point sources. All significant sources have been discussed and considered.

Allocation

Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.

The loading capacity for the pollutant was determined using the relationships between the chlorophyll-a numeric target and the pollutant levels. The explicit margin of safety was

subtracted from the loading capacity, and the remainder was divided between the Waste Load Allocation and the Load Allocation.

WLA Comment

The WLAs for phosphorus and nitrogen are established as zero.

LA Comment

The LA for total phosphorus is established as 210.3 pounds per year. The LA for nitrogen is established as 1,012.0 pounds per year.

Margin of Safety

Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.

The explicit Margin of Safety was set to compensate for the lack of knowledge about the relationship between the allocated loadings and the resulting water quality. The MOS for total phosphorus is 23.4 pounds per year, and the MOS for nitrogen is 112.4 pounds per year.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).

Seasonal variation is considered in the document "Lake and Wetlands Monitoring Program 1998 Annual Report" by C. Edward Carney dated May 1999, and included by reference in all eutrophication TMDLs. For example, page 24 discusses sampling during times representative of "normal" summer conditions. Seasonal variation and critical conditions are accounted for by conducting seasonal sampling and by considering the magnitude of runoff which is chiefly generated when the rainfall rate is greater than the rate at which rain can infiltrate the soil.

Public Participation

Submital describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).

A public meeting was held in Ottawa on February 28, 2001. A public hearing was held in Fort Scott on May 30, and Ottawa on May 31, 2001. The TMDL document was posted on KDHE's Internet Website.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).

Sampling and evaluation will occur once before 2006 and once between 2006 and 2011.

Reasonable assurance

Reasonable assurance only applies when reduction in nonpoint source loading is required to meet the prescribed waste load allocations.

Reasonable assurance is not required for this TMDL, but includes numerous authorities and funding through the Kansas Water Plan.
